



## COVID 19 in Cancer Afflicted Children - Impact and Lessons Learnt So Far

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**Abstract**

COVID 19 has affected Cancer afflicted children in multiple ways. Postponement of chemotherapy, shortage of beds, delayed elective surgeries, radiotherapy, contracting Covid infection due to Immunosuppressed state, shortage of blood and blood products are few of them. However, it has also taught us certain lessons as to continue chemotherapy in cancers which affect the long term prognosis. The concept of chronic viral shedders, non-requirement of repeat RT-PCR testing, avoiding use of colony stimulating factors during active infection are some of the lessons learnt so far. The fact that children per se and that includes children with cancer too are not affected seriously till date in this pandemic brings some solace to the treating physicians.

**Keywords:** COVID 19; Cancer; Oncology

Cancer in children is a highly curable disease if detected, diagnosed and treated early. However most of the children in low and middle income countries are usually in advanced stages by the time they seek medical help. Multiple factors are responsible for this. Covid pandemic has just added to the misery of children in lower and middle income countries. Due to lockdown, fear of covid virus infection and financial constraints imposed by the pandemic, cancer afflicted children have been very adversely affected. Shortage of blood products due to fewer volunteers coming forward to donate has added to the woes of these cancer afflicted children. The Pediatric oncology units have tried to best manage the spread of virus within their setups and also provide optimum care to cancer affected children. This article by doing a literature review summarizes the lessons learnt in children with cancer affected with Covid 19 during this pandemic.

Dylan Graetz and colleagues [1] in a cross-sectional survey from June 22 to August 21, 2020 at 213 institutions in 79 countries investigated the effect of the COVID-19 pandemic on childhood cancer care worldwide. They assessed the characteristics of the institutions, the number of patients diagnosed with COVID-19 and disruptions and adaptations to cancer care. They concluded that the COVID-19 pandemic had substantially affected childhood cancer diagnosis and management worldwide but more so in low and middle-income countries than in high-income countries. This was highlighted by the statistical analysis as follows, unavailability of chemotherapy agents ( $p = 0.022$ ), treatment abandonment ( $p < 0.0001$ ), and interruptions in radiotherapy ( $p < 0.0001$ ) were more frequent in low-income and middle-income countries.

Vasquez and colleagues [2] in April 2020 in their study across Latin America reported indefinite delays in follow-up appointments, surgeries and outpatient procedures, stem cell transplantation and outpatient care. Their survey also included how the pandemic had required modification of chemotherapy regimen in 36% of cases due to unavailability of chemotherapeutic drugs and also deduced that 79% had reported a shortage of blood products. All this just added to the woes of late diagnosis and treatment abandonment or interruptions in low and middle income countries like Latin America. Lockdown in low and middle income countries increased unemployment adding to drug interruptions or treatment abandonment. Most of the hospitals adopted to teleconsulting in follow up patients to implement social distancing, laboratory reports post chemotherapy were also forwarded on digital platforms. This ensured minimum acute patients attending outpatient clinics.

A cross-sectional observational study for children diagnosed with cancer at the Prince Sultan Military Medical City in Riyadh [3] on 204 cancer afflicted children reported a delay in treatment in 63% of patients. The reasons reported were hospital cancellations, limited bed availability, lockdown and curfew, swab requirement prior to admission, risk of infection in hospital environment or current infection with Covid 19. This study also studied the psychological impact the pandemic had on cancer afflicted children and deduced that 53.5% children were more concerned about the complications which may result from contracting the virus.

This pandemic benefited cancer afflicted children in certain countries. The Peruvian legislature proposed the Childhood Cancer Law in April 2020 which strives to benefit children and ado-

lescents with cancer by implementing universal health coverage, conferring a financial allowance (the equivalent of two minimum-wage salaries) while their child is under treatment, and building a National Program for Children and Adolescents with cancer that incorporates a population-based pediatric cancer registry [4].

Children infected by Covid 19 had milder symptoms as compared to adults during this Covid pandemic. A similar trend was seen in cancer affected children, the severity of infection being mild in most of the cases despite being immunocompromised [5-7].

The Children's Oncology group (COG) advised children with cancer to continue chemotherapy in spite of the pandemic. If symptomatic with fever, to follow the usual instructions as advised by the health care team. JAMA Oncology on May 13, 2020 [8] published a study of 178 kids with cancer undergoing treatment at Memorial Sloan Kettering from March to April. They found a positivity of 11.2% of Covid 19 amongst children following up for cancer care. Only one of the 20 children who tested positive required hospitalization for symptoms but none of them required critical care. COG enumerated the risk factors of susceptibility to catch Covid 19 infection in cancer afflicted children. These included children with lowered immunity to viral infections as seen in survivors with chronic graft versus-host disease or those on certain medications like corticosteroids, immunosuppressants or those currently receiving chemotherapy or have been treated with chemotherapy within the past 6 months. According to COG, children with heart or lung conditions such as cardiomyopathy or pulmonary fibrosis are also more susceptible to Covid19 infection. Also children with cancer who have received treatments that may damage the heart or lungs may be at increased risk for complications if they develop COVID-19 infection. These treatments include: Anthracyclines such as doxorubicin and daunorubicin; Bleomycin, busulfan, carmustine, or lomustine chemotherapy; or Radiation involving the heart or lungs, including total body irradiation (TBI) and radiation to the chest, axilla, abdomen, or spine".

Thus to summarize the challenges faced by children with cancer are delay in access to care due to travel restrictions, delay in starting treatment due to overburdened health care system and shortage of staff, postponement of planned surgeries and stem cell transplant due to bed and other infrastructure crunch, shortage of drugs, blood products and funding from Non governmental organizations [9].

As far as treatment of children with cancer is concerned certain pertinent factors need to be taken into account such as biology of the cancer, the need for hospitalization, the number of clinic visits required, and the anticipated degree of immunosuppression. Avoiding treatment delays for curable cancers is advocated as in Pediatric leukemias as the prognosis is affected with delay in treatment. Regimens that can be administered orally or those

that require fewer infusions should be preferred when deciding between equally effective treatment regimens [10]. Granulocyte colony-stimulating factor (G-CSF) should be given with chemotherapy regimens that have intermediate (10% to 20%) or high (> 20%) risk of febrile neutropenia to avert inpatient hospitalization [11]. Radiotherapy guidelines suggest increasing the dose per fraction to minimize the number of hospital visits during the COVID-19 pandemic [12,13]. If suffering from Covid infection it is suggested if possible to withhold treatment until symptoms have resolved. It is unclear as to the optimal duration of time regarding when can chemotherapy be restarted post Covid recovery. Prolonged viral shedding detected by molecular testing is known to occur in cancer patients but its impact on outcome is unknown [14]. Therefore repeat testing post symptomatic Covid recovery is usually not recommended. The NCCN also recommends discontinuing growth factors in patients with cancer and acute SARS-CoV-2 infection without underlying bacterial or fungal infections to avoid the hypothetical risk of increasing inflammatory cytokine levels and pulmonary inflammation [11].

Personally, none of my 5 pediatric cancer patients progressed to moderate or severe disease in spite of being on chemotherapy while suffering from Covid. No antiviral treatment was required. Symptomatic treatment was adequate for all of them. One child was repeatedly RT-PCR positive turning out to be a chronic viral shedder. RT-PCR was repeated prior to next cycle or after 14 days whichever was earlier. Hence to summarize our experience of Covid in children with cancer is in its nascent stage and is evolving with each passing day as together we strive to fight this pandemic and provide optimum help to our cancer affected children.

### Conflict of Interest

None.

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